

1 At the bottom of page 5 and carrying over to the following page, the present application
2 includes the following description of the reactant metal to be used in the present process:

3 The reactant metal preferably includes primarily aluminum and may
4 include minor amounts of iron, copper, zinc, and calcium. A suitable reactant
5 alloy is disclosed in U.S. Patent No. 5,000,101, which is incorporated herein by
6 this reference.

7 Numerous points in the incorporated patent disclose the reactant metal temperature of
8 approximately or about 800 degrees Celsius, at which point steel rapidly dissolves in the reactant
9 metal. Note particularly lines 16-18, lines 33-40, and 56-58 of Column 3 and Claims 1, 11, and
10 16 of U.S. Patent No. 5,000,101.

11 Because the present application specifically cites the reactant metal described in U.S.
12 Patent No. 5,000,101 as being suitable for use in the present process, and the incorporated patent
13 specifically discloses the limitation of approximately 800 degrees Celsius for the reactant metal,
14 the Applicant respectfully submits that the limitation is clearly supported by the present
15 application as originally filed in accordance with 35 U.S.C. §112, first paragraph. See M.P.E.P
16 §608.01(p)(I)(A) regarding incorporation by reference.

17 The Applicant therefore respectfully requests that the Section 112, first paragraph
18 rejection of Claims 9 and 13 be withdrawn.

19
20 CLAIMS 8 THROUGH 11 ARE NOT INDEFINITE UNDER 35 U.S.C. §112 ¶2

21 The Examiner rejected Claims 8 through 11 under 35 U.S.C. §112, second paragraph, as
22 being indefinite. The undersigned attorney understood the Examiner to indicate that the above
23 amendment would obviate the rejections under section 112, second paragraph. The Applicant

1 believes the above amendment does not create any new limitation in the claim and is in fact
2 equivalent to the claim language to which the Examiner objected.

3 Claim 8 is also amended above to recite the correct article when referencing the "tire
4 portion" in the first line of element (a). In reviewing the claim, the Applicant noted that it was
5 intended to refer to the same "tire portion" described in the preamble of the claim. Thus, the
6 definite article "the" is appropriate.

7
8 CLAIMS 8-19 ARE ALLOWABLE OVER THE CITED ART

9 The Examiner rejected Claims 8 through 19 under 35 U.S.C. §103(a) as being as being
10 unpatentable over U.S. Patent No. 3,996,022 to Larsen (the "Larsen patent") in view of U.S.
11 Patent No. 5,236,352 to Carpenter (the "Carpenter patent") and in view of U.S. Patent No.
12 2,858,255 to Segui et al. (the "Segui patent"). The Applicant respectfully submits that Claims 8
13 through 19 are not obvious in view of the Larsen, Carpenter, and Segui patents and are entitled to
14 allowance. In particular, the Applicant submits that the Larsen, Carpenter, and Segui patents do
15 not individually or as combined teach or suggest all of the elements set out in the present claims,
16 and furthermore cannot be properly combined as proposed by the Examiner.

17 The Cited References Do Not Teach Or Suggest All Limitations Appearing In Independent
18 Claims 8, 12, and 16

19 The present invention employs particular types of molten reactant metals to destroy tires
20 and to recover useful products. A fundamental limitation appearing in each of the independent
21 claims is that the reactant metal is not only capable of destroying organic compounds in the tires,
22 but is also capable of dissolving the steel in the tire. Element (a) of Claim 8 requires contacting a
23 tire portion with a molten reactant metal including aluminum under conditions sufficient to allow

1 the dissolution of steel into the molten reactant metal. Each of Claims 12 and 16 include similar
2 limitations as to the nature of the reactant metal used in the present process. Claim 16 specifies
3 the temperature of about 800 degrees Celsius for the reactant metal, as do dependent Claims 9
4 and 13.

5 The Larsen, Carpenter, and Segui references do not in any way teach or suggest
6 contacting waste tires with any molten material that is at once capable of destroying the organic
7 materials in the tires and dissolving the steel contained in the tires. Larsen discloses a process
8 employing a molten salt catalyst to convert natural and synthetic rubbers into useful products.
9 Carpenter teaches using hot oil and a slurry of liquified tire material itself at 400 degrees Celsius
10 to liquify portions of the tire other than the steel belts and beads. The Segui Patent discloses
11 using a molten metal bath of at 450 to 500 degrees Celsius to depolymerize certain types of
12 polymers. Segui specifically teaches at Col. 1, lines 35 and 36 that the molten material is inert to
13 the depolymerization. That is, the molten material is simply used as a heat transfer agent. Segui
14 does suggest using aluminum in the molten bath, but specifically teaches against using a
15 chemically reactive bath, and thus suggests much lower bath temperatures than required in the
16 present claims.

17 Claim 8 further requires that the step of contacting the tires with the molten reactant
18 metal is done for a reaction period sufficient to allow substantially all organic materials originally
19 included in the tire portion to react with the molten reactant metal, but leaving the steel
20 component substantially intact. Element (c) of Claim 8 requires removing the tire carrier
21 immediately after the reaction period.

22 Claim 16 requires reacting a tire portion with a reactant metal at 800 degrees Celsius to
23 produce liberated carbon. The claim further requires the steps of collecting the liberated carbon

1 together with gasses escaping from the molten reactant metal, and retrieving the remaining steel
2 component of the tire portion from the molten reactant metal. Although the Carpenter patent
3 discloses a method in which rubber portions of a tire are liquified and the remaining steel is
4 recovered, the process does not involve liberating carbon or collecting liberated carbon together
5 with gasses escaping from the hot slurry. The make up and temperature of the slurry in the
6 Carpenter reference simply prevents carbon from being liberated with gasses.

7 Because the cited references do not teach or suggest all of the limitations set out in
8 Claims 8, 12, and 16, these claims are not obvious in view of the references and are entitled to
9 allowance together with their respective dependent claims.

10 There Is No Teaching Or Suggestion To Make The Proposed Combination Of References

11 One of the basic requirements of a prima facie case for obviousness is that the prior art
12 must provide some teaching, motivation, or suggestion to make the proposed combination. In
13 this case, the Applicant submits there is no such teaching, suggestion, or motivation, and thus
14 that the combination of Larsen, Carpenter, and Segui proposed by the Examiner is improper.

15 Since the Larsen and Carpenter references do not teach or suggest using a molten metal to
16 treat tires, the Examiner relied on the use of molten metals in the Segui reference in an attempt to
17 meet the requirements of the present claims. However, the Segui patent is directed to a
18 depolymerization process specific to a particular type of polymer and does not teach or suggest
19 any process applicable to waste tires. **Furthermore, the Segui patent specifically teaches that**
20 **the molten material is non-reactive, which is totally contrary to the requirement in the**
21 **present claims of a reactant metal.**

22 The present invention relies on a particular characteristic of molten reactant metals
23 including aluminum and similar metals at about 800 degrees C and above. These molten reactant

1 metals react very quickly with organic compounds to liberate carbon along with various gasses
2 such as hydrogen and nitrogen, and to produce metal salts. The claimed molten reactant metals
3 also have the property of dissolving steels, including stainless steels, at a rapid pace. All of the
4 prior art tire processing systems that use molten materials use materials that will facilitate the
5 decomposition or reaction of organics in the tires, but do not react with the steel components of
6 the tires. In fact, using a reactant metal that actually reacts with steel would seem to be
7 undesirable since it would cause the steel to be lost to the molten bath rather than be left in a
8 condition in which it could be easily recovered from the bath. Dissolving steel in the reactant
9 metal bath is also highly undesirable because the dissolved steel essentially corrupts the reactant
10 metal bath and ultimately increases the temperature at which the bath must be maintained in
11 order to keep the material in a molten state. However, the Applicant has determined that the
12 particular reactant metals set out in the claims may be used to react the organic compounds in a
13 tire without destroying the bulk of the steel in the tire if the remnant of the tire is removed from
14 the bath promptly after a period of time required to destroy all the organics. The Applicant has
15 determined that this is possible due to location of the steel components in the tire vis-a-vis the
16 organic material and due to the relative rates of reaction between the reactant metal and the
17 organics as opposed to the reactant metal and the steel.

18 The cited prior art teaches using hot liquids such as oil, molten salts, certain low
19 temperature, non-reactive molten metals to recover the organic components of waste tires. The
20 prior art related to treating tires does not teach or suggest using a molten reactant metal. This is
21 in spite of the fact that molten reactant metals of the type set out in the present claims have been
22 used for some time in the treatment of other organic waste material as indicated by the
23 incorporated patent, U.S. Patent No. 5,000,101. The invention in this case is the discovery that

1 the type of molten reactant metals disclosed in U.S. Patent No. 5,000,101 may be used to treat
2 waste tires and recover materials from tires in spite of the fact that the reactant metal at the
3 specified conditions actually dissolves the steel components of the tires. The problem of using
4 such a material to treat tires is that as steel dissolves into the molten reactant metal, it changes the
5 characteristics of the molten material and ultimately begins to require higher and higher
6 temperatures to maintain a molten state. Thus, it would appear to be undesirable to use the
7 specified molten reactant metal to treat waste tires. Again, the invention in this case is ultimately
8 the discovery that the specified molten reactant metal can be used to recover materials from
9 waste tires despite the seemingly incompatible characteristic of dissolving steel.

10 The prior art does not suggest the use of the specified molten reactant metal to treat waste
11 tires and does not show any appreciation for the problem of using such a material for treating
12 waste tires. The tire treatment systems disclosed by Larsen and Carpenter use treatment
13 materials that would allow the remaining steel components of the tires to be submerged in the
14 treatment material indefinitely with no adverse effect on the steel. The Segui patent, which is
15 directed only to a depolymerization process for certain types of polymers, very specifically
16 requires the molten metal to be inert to the depolymerization, that is, unreactive. There is simply
17 no teaching, motivation, or suggestion in any of the prior art references or anywhere else in the
18 prior art to combine the Larsen, Carpenter, and Segui references, or any other references of
19 record in the case in any way to result in the invention set out in the present claims. Thus, the
20 Applicant respectfully submits that all of the claims remaining in this case are not obvious in
21 view of the prior art and are entitled to allowance.

1 CONCLUSION

2 For all of the above reasons and in view of the amendment to claim 8, the Applicant
3 respectfully requests reconsideration and allowance of Claims 8 through 19.

4 If the Examiner should feel that any issue remains as to the allowability of these claims,
5 or that a further conference might expedite allowance of the claims, he is asked to telephone the
6 undersigned attorney.

7 Respectfully submitted,

8 SHAFFER & CULBERTSON, L.L.P.

9
10 Date: 22 Dec 2003

By: 

Russell D. Culbertson, Reg. No. 32,124
J. Nevin Shaffer, Jr., Reg. No. 29,858
Trevor Lind, Reg. No. 54,785
1114 Lost Creek Blvd.
Suite 420
Austin, Texas 78746
512-327-8932
ATTORNEYS FOR APPLICANT

19
20 CERTIFICATE OF FACSIMILE

21
22 I hereby certify that this correspondence is being facsimile transmitted to the United States Patent and Trademark
23 Office, (Fax No. 703-872-9306) on December 22, 2003.

24
25
26 Russell D. Culbertson, Reg. No. 32,124 